CLAIMS

What is claimed is:

1. A method comprising the steps of:
forming a polyol in the presence of a double metal cyanide catalyst;
adding a soluble polymeric acid to said polyol;
reacting said polymeric acid with said double metal cyanide catalyst to form an agglomeration; and
removing said agglomeration from said polyol.

2. The method as set forth in claim 1, wherein said polymeric acid is selected from the group of polycarboxylic acid, polysulfonic acid, polyacrylic acid and mixtures thereof.

3. The method as set forth in claim 1, wherein said step of reacting said polymeric acid with said double metal cyanide catalyst is further defined by protonating said polyol thereby removing said double metal cyanide catalyst from said polyol.

4. The method as set forth in claim 1, wherein said polymeric acid has a molecular weight from about 500 to about 10,000.

5. The method as set forth in claim 1, wherein said polymeric acid has at least two reactive groups, each reactive group being capable of reacting with said double metal cyanide catalyst to form said agglomeration.

6. The method as set forth in claim 1, further comprising the step of reacting said agglomeration with an acid after the removing step, thereby separating said agglomeration into said polymeric acid and said double metal cyanide catalyst and regenerating the DMC catalyst in its original active form.

7. The method as set forth in claim 1, wherein said polymeric acid is added in an amount such that the molar ratio of said polymeric acid to said double metal cyanide catalyst ranges from 0.01:1 to 10:1.

8. The method as set forth in claim 1, wherein said polymeric acid is added in an amount such that the molar ratio of said polymeric acid to said double metal cyanide catalyst ranges from 0.1:1 to 1:1.

9. The method as set forth in claim 1, wherein said DMC containing polyol is treated with said polymeric acid to affect agglomeration for at least 1 hour.

10. The method as set forth in claim 1, wherein said DMC containing polyol is treated with said polymeric acid to affect agglomeration at a temperature of 90C - 150C.

11. The method as set forth in claim 1, wherein said step of removing said agglomeration from said polyol comprises at least one of: filtering said agglomeration from said polyol by centrifugation or by using indexing filters.

12. The method as set forth in claim 1, wherein said polymeric acid is soluble in water.

13. The method as set forth in claim 1, further comprising the step of adding one of acetic acid or hydrochloric acid to said agglomeration following the removing step, thereby separating said agglomeration into said double metal cyanide catalyst and said polymeric acid.

14. The method as set forth in claim 13, further including the step of collecting and reusing said double metal cyanide catalyst.

15. The method as set forth in claim 13, further including the step of collecting, washing with water, drying and reusing said double metal cyanide catalyst.

16. The method as set forth in claim 13, further including the step of collecting, purifying by recrystallization and reusing said double metal cyanide catalyst.

17. The method as set forth in claim 13, wherein said on of acetic acid or hydrochloric acid is added in an amount such that the molar ratio of the acetic acid or hydrochloric acid to double metal cyanide catalyst is from about 0.1:1 to 100:1.

18. The method as set forth in claim 13, wherein one of said acetic acid or hydrochloric acid is added in an amount such that the molar ratio of the acetic acid or hydrochloric acid to double metal cyanide catalyst is from about 1:1 to about 10:1.

19. The method as set forth in claim 1, wherein said polymeric acid is added to said polyol when said polyol has reached a desired molecular weight.

20. A method comprising the steps of:
forming a polyol in the presence of a double metal cyanide catalyst;
adding a soluble polymeric amine to said polyol;
reacting said polymeric amine with said double metal cyanide catalyst to form an agglomeration; and
removing said agglomeration from said polyol.

21. The method as set forth in claim 20, wherein said step of removing said agglomeration from said polyol comprises filtering said agglomeration from said polyol by using centrifugation or by using indexing filters.

22. A method comprising the steps of:
forming a polyol in the presence of a multi metal cyanide catalyst;
adding an adsorbent having at least two reactive sites capable of protonating the polyol;
protonating the polyol thereby separating the multi metal cyanide catalyst from said polyol;
forming an agglomeration of said multi metal cyanide catalyst and said adsorbent; and
separating said agglomeration from said polyol.

23. The method as set forth in claim 22, wherein said adsorbent is soluble in the polyol and in water.

24. The method as set forth in claim 22, wherein said adsorbent is a polymeric acid.

25. The method as set forth in claim 24, wherein said polymeric acid comprises: polycarboxylic acid, polysulfonic acid, polyacrylic acid or mixtures thereof.

26. The method as set forth in claim 22, further comprising the step of separating said adsorbent from said multi metal cyanide catalyst.

27. The method as set forth in claim 22, further comprising the step of adding one of acetic acid or hydrochloric acid to said agglomeration thereby separating said multi metal cyanide catalyst from said adsorbent.

28. The method as set forth in claim 27, wherein the acetic acid or the hydrochloric acid is added in an amount such that the molar ratio of the acetic acid or the hydrochloric acid to multi metal cyanide catalyst is from about 1:1 to 10:1.

29. The method as set forth in claim 22, wherein said adsorbent is added to said polyol when said polyol has reached a desired molecular weight.

30. A method comprising the steps of:
forming a polyol in the presence of a double metal cyanide catalyst;
adding a soluble polymeric acid to said polyol;
reacting said polymeric acid with said double metal cyanide catalyst to form an agglomeration;
removing said agglomeration from said polyol; and
regenerating the double metal cyanide catalyst.

31. The method as set forth in claim 30, wherein said step of removing said agglomeration from said polyol comprises one of filtering said agglomeration from said polyol by centrifugation or by using indexing filters.

32. The method as set forth in claim 30, wherein said step of regenerating said double metal cyanide catalyst comprises washing said agglomeration with one of acetic acid or hydrochloric acid.

33. The method as set forth in claim 30, wherein said polymeric acid comprises polycarboxylic acid, polysulfonic acid, polyacrylic acid or mixtures thereof.

34. The method as set forth in claim 30, wherein said step of reacting said polymeric acid with said double metal cyanide catalyst is further defined by protonating said polyol thereby removing said double metal cyanide catalyst from said polyol.

35. The method as set forth in claim 30, wherein said polymeric acid has a molecular weight from about 500 to about 10,000.

36. The method as set forth in claim 30, wherein said polymeric acid has at least two reactive groups, each reactive group being capable of reacting with said double metal cyanide catalyst thereby forming an agglomeration.

37. The method as set forth in claim 30, further comprising the step of reacting an acid with said agglomeration thereby separating said polymeric acid from said double metal cyanide catalyst.

38. The method as set forth in claim 30, wherein said polymeric acid is added in an amount such that the molar ratio of said polymeric acid to said double metal cyanide catalyst ranges from 0.1:1 to 10:1.

39. The method as set forth in claim 30, wherein said polymeric acid is soluble in water.

40. The method as set forth in claim 30, wherein said step of adding a soluble polymeric acid to said polyol is further defined by adding said polymeric acid when said polyol has reached a desired molecular weight.